

### REMARKS

The above amendments and the following remarks do not raise significant new issues or require additional searching by the Examiner. Entry of this Amendment under Rule 116 is merited, and reconsideration and allowance in view of the foregoing amendments and the following remarks are respectfully requested.

Claims 1, 7 and 12 have been amended. Claims 1-18 are pending in this application.

Claims 1-6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Horii in view of Applicant's Admitted Prior Art (AAPA). Applicant traverses the rejection for the following reasons.

Applicant submits that neither Horii nor AAPA, either alone or in combination, discloses or suggests all of the limitations of the claimed invention. In particular, the prior art cited by the Examiner fail to disclose or suggest a diffusion barrier layer recessed in a contact hole and a seed layer for electro plating by filling a remaining portion of the contact hole, as recited in claim 1, as amended.

When a seed layer and a bottom electrode are misaligned to a plug including a barrier metal layer, a surface of the barrier metal layer comes in contact with a dielectric layer formed on the bottom electrode so that the barrier metal layer is oxidized during a thermal process, e. g., a crystallization process of the

dielectric layer. In order to prevent contact between the dielectric layer and the barrier metal layer, a seed layer is formed on the barrier metal layer such that the contact hole is completely buried with the plug including the barrier metal layer and the seed layer, as provided in the claimed invention.

In contrast, according to Horii, as shown in Fig. 1H, a conductive seed layer 40 is formed only on the sidewalls of the contact hole and a buried contact 72 fills a remaining portion of the contact hole, which is clearly distinguishable from the feature of the claimed invention. On the other hand, according to AAPA, as shown in Fig. 2B, a seed layer 21 is not formed in the contact hole.

Accordingly, the prior art, as combined, fail to disclose or suggest at least the seed layer of claim 1, which is formed on the diffusion barrier layer and which fills the remaining portion of the contact hole. Therefore, Applicant respectfully submits that claim 1 is not made obvious over Horii in view of AAPA under 35 U.S.C. §103(a).

Claims 2-6, which are dependent on claim 1, are patentable for the reasons discussed above with respect to claim 1, as well as on their own merits.

Claims 7-16 and 18 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Horii in view of AAPA, and further in view of Simpson et al. Applicant traverses the rejection for the

following reasons.

Amended independent claims 7 and 12 now recite a step of forming a seed layer for electro plating on a diffusion barrier layer to fill a remaining portion of the contact hole. In other words, the seed layer is formed on the barrier metal layer to be buried in the contact plug. As set forth above with respect to claim 1, the claimed invention provides this step in order to prevent contact between the dielectric layer and the barrier metal layer. As discussed above, Horii and AAPA, either alone or in combination, fail to disclose or suggest these limitations. Applicant submits that Simpson et al. does not supply the above-noted deficiencies of Horii and AAPA.

Therefore, claims 7 and 12 are not made obvious over Horii in view of AAPA, and further in view of Simpson et al. under 35 U.S.C. §103(a).


Claims 8-11, 13-16 and 18, which are dependent on claim 7 or 12, are patentable for the reasons discussed above with respect to claims 7 and 12, as well as on their own merits.

Claim 17 stands objected to as being dependent upon a rejected claim, but would be allowable if rewritten in independent form. As claim 12 is believed to be allowable, Applicant submits that claim 17, which is dependent on claim 12, is also allowable.

All objections and rejections having been addressed, it is respectfully submitted that claims 1-18 are now in condition for

allowance and a notice to that effect is earnestly solicited. If any issues remain to be resolved, the Examiner is cordially invited to telephone the undersigned attorney at the number listed below.

Respectfully submitted,

By:   
Yoon S. Ham  
Reg. No. 45,307  
Direct Tel.: (202) 662-8483

JACOBSON HOLMAN PLLC  
The Jenifer Building  
400 Seventh Street, N.W.  
Washington, D.C. 20004-2201  
(202) 638-6666

Atty. Docket: P66792US0  
YSH:dj